COMPLETE LISTING OF CLAIMS IN ASCENDING ORDER WITH STATUS INDICATOR

CLAIMS

1. (Canceled)

2. (Canceled)

3. (Canceled)

4. (Canceled)

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6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Canceled)

11. (Currently amended) A device for matching an antenna impedance in a portable radio telephone ~~comprising a radio having a transmission/receiving circuit~~ that includes transmission and

receiving circuits, a foldable casing ~~enclosing the radio telephone~~, the foldable casing movable between an unfolded position and a folded position, and an antenna movable between an extracted position from the foldable casing and a retracted position into the foldable casing, the device comprising:

means for storing a plurality of digital voltages wherein each digital voltage is associated with a corresponding radio telephone configuration, wherein the configuration is defined by the foldable casing position, the antenna position, and whether the radio telephone is in transmitting mode or receiving mode;

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means for ~~sensing~~ determining the foldable casing position, the antenna position, and whether the ~~foldable casing is in the unfolded position and for sensing whether the antenna is in the extracted position~~ radio telephone is in transmitting or receiving mode, and for providing a ~~sensing~~ first signal in response thereto; and,

means for matching ~~an~~ the impedance of the radio telephone antenna ~~and an impedance of the transmission/receiving circuit~~ in response to the ~~sensing~~ first signal, wherein the means for matching uses a digital voltage, from among the plurality of digital voltages, corresponding to the first signal.

12. (Currently amended) A device as claimed in claim 11, wherein the means for matching impedances includes:

a controller for receiving the sensing signal, ~~indicating whether the foldable casing is in the folded or unfolded position, wherein the controller provides a~~ and for providing the digital voltage corresponding to the ~~sensing~~ first signal;

a digital-to-analog converter for converting the digital voltage into an analog voltage; and

a matching circuit for matching ~~an~~ the impedance of the antenna ~~and an impedance of the transmission/receiving circuit~~ in response to the analog voltage.

13. (Canceled)

14. (Canceled)

15. (Original) A device as claimed in claim 12, wherein the matching circuit includes:

an inductor connected between the antenna and the transmission/reception circuit;

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a first capacitor having a first end connected to the inductor and the transmission/reception circuit, and having a second end grounded;

a second capacitor and a variable capacitance diode connected in series between the antenna and ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

16. (Previously presented) A device as claimed in claim 12, wherein the matching circuit includes:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

17. (Currently amended) A device for matching an antenna impedance in a portable radio telephone ~~including a radio~~ having transmission and receiving circuits, a foldable casing ~~enclosing the radio~~, the foldable casing movable between an unfolded position and a folded position, and an antenna movable between an extracted position ~~from the foldable~~ ~~casing~~ and a retracted position ~~into the foldable casing~~, the device comprising:

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means for sensing the position of the foldable casing and the antenna, ~~whether the foldable casing is in the unfolded position, and for sensing whether the antenna is in the extracted position,~~ and for providing a sensing signal in response thereto;

means for determining optimal antenna impedance values where each value corresponds with a different radio telephone configuration based on the position of the foldable casing and the antenna and whether the portable radio telephone is transmitting or receiving;

means for storing a voltage corresponding to each of the optimal antenna impedance values; and

means for matching the antenna impedance based on the sensing signal and a stored voltage corresponding to the sensed position of the foldable casing and the antenna.

~~a measurement device for providing a RF signal to the antenna and for measuring an RF signal from the antenna;~~

~~a controller for controlling the measurement device to provide the RF signal to the antenna in a reception mode, and to measure the RF signal from the antenna in a transmission mode, and for determining optimal antenna impedance matching values for transmitting and receiving, respectively,~~

~~as well as the folder casing and antenna positions, and for storing the optimal impedance matching values; and~~

~~means for adjusting an impedance match between the antenna and the radio in response to the sensing signal under the control of the controller for each folder casing position, antenna position, and transmission and reception mode to vary an antenna impedance matching, the controller measuring a transmission level in the transmission mode and a reception sensitivity in the reception mode every time the antenna impedance matching is varied, to determine optimal antenna impedance matching values for each folder casing position, antenna position, and transmission and reception mode, and to store the optimal antenna impedance matching values therein.~~

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18. (Currently amended) A device as claimed in claim 17, wherein the means for ~~adjusting~~ determining optimal impedance values comprises: ~~the impedance match includes:~~

means for measuring a reception and transmission signal strength;

means for adjusting a voltage by a fixed increment from 0V to a fixed voltage level;

means for converting the adjusted voltage into an analog voltage;

means for setting the impedance of the antenna according to the analog voltage; and

means for identifying when the means for measuring a reception and transmission signal strength has measured a maximum signal strength, and for determining the analog voltage corresponding to the measured maximum signal strength.

~~a central processing unit (CPU) adjusting a voltage by a fixed increment from 0V to a fixed voltage level in response to the sensing signal under the control of the controller for each folder casing position, antenna position, and transmission and reception mode to vary an antenna impedance matching, and for causing the controller to measure the transmission level in the transmission mode~~

~~and the reception sensitivity in the reception mode every time the antenna impedance matching is varied, and for providing a control signal for storing the optimal antenna impedance matching values;~~

~~a memory for storing the optimal antenna impedance matching values under the control of the CPU;~~

~~a digital-to-analog converter for converting the voltage provided by the CPU into an analog voltage; and~~

~~a matching circuit for matching the impedance of the antenna and an impedance of the radio in response to the analog voltage.~~

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19. (Currently amended) A device as claimed in claim 18, wherein the ~~matching circuit~~ means for matching the impedance comprises ~~includes~~:

an inductor connected between the antenna and the transmission/reception circuit;

a first capacitor having a first end connected to the inductor and the transmission/reception circuit, and having a second end grounded;

a second capacitor and a variable capacitance diode connected in series between the antenna and ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

20. (Currently amended) A device as claimed in claim 18, wherein the ~~matching circuit~~ means for matching the impedance comprises ~~includes~~:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

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40. (Previously presented) The device as claimed in claim 18, wherein the fixed increment is

approximately 0.5V.

41. (Previously presented) The device as claimed in claim 18, wherein the fixed voltage level is approximately 255V.

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71. (New) A method of adjusting an antenna impedance in a portable radio telephone that includes transmission and receive circuits, a foldable casing enclosing the radio, the foldable casing movable between an unfolded position and a folded position, and an antenna movable between an extracted position from the foldable casing and a retracted position into the foldable casing, said method comprising the steps of:

sensing a configuration of the radio telephone, wherein the configuration is defined by the position of the foldable casing, the position of the antenna and whether the radio telephone is in transmit or receive mode, and providing a sensing signal in response thereto;

measuring a reception/transmission signal strength at a radio frequency for each of a plurality of antenna impedances and for each of a plurality of radio telephone configurations;

determining an optimal antenna impedance for each configuration;

storing a voltage corresponding to the optimal antenna impedance for each configuration; and

setting the antenna impedance based on the stored voltage, according to the sensing signal provided in response to the sensed radio telephone configuration.

72. (New) The method of claim 71, wherein the determining step comprises:

adjusting a voltage by a fixed increment from 0V to a fixed voltage level;

converting the adjusted voltage into an analog voltage; and

matching the impedance of the antenna in response to the analog voltage.

73. (New) The method of claim 71, wherein the radio frequency is one of a low frequency, a center frequency, and a high frequency in a receiving/transmitting frequency.

74. (New) A method for matching an antenna impedance in a portable radio telephone that includes a radio having transmission and receiving circuits, a foldable case enclosing the radio, the foldable case movable between an unfolded position and a folded position, and an antenna movable between an extracted position from the foldable case and a retracted position into the foldable case, said method comprising the steps of:

sensing whether the antenna is in the extended position in transmitting or receiving mode and for producing at least one sensing signal in response thereto; and

matching an impedance of the antenna in response to the sensing signal.

75. (New) A device for matching antenna impedance in a radio telephone that includes a foldable case, said device comprising:

memory for storing a plurality of digital values, each associated with a corresponding telephone configuration, wherein the configuration is defined by the position of the case, the position of the antenna and whether the telephone is transmitting or receiving;

means for sensing the configuration;

means for generating a sensing signal that reflects the sensed configuration; and

B1 means for matching the antenna impedance based on a selected one of the stored digital values that corresponds with the sensing signal.

76. (New) The device of claim 75, wherein the means for matching comprises:

a controller for selecting one of the stored digital values the value as a function of the sensing signal;

digital to analog converter for generating an analog signal corresponding to the one selected digital value;

an impedance matching circuit; and

means for applying the analog signal to the impedance matching circuit.

77. (New). The device of claim 76, wherein said analog signal represents a voltage.